

# **Virginia**

Standards of Learning Assessments

**Test Blueprint**

## **Grade 8 Mathematics**

**2016 Mathematics  
Standards of Learning**

**This revised test blueprint will be effective with the  
administration of the 2018-2019 Mathematics Standards of  
Learning (SOL) tests.**

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# **Grade 8 Mathematics Standards of Learning**

## **Test Blueprint**

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## **General Test Information**

### **Test Blueprint**

Much like the blueprint for a building, a test blueprint serves as a guide for test construction. The blueprint indicates the content areas that will be addressed by the test and the number of items that will be included by content area and for the test as a whole. There is a blueprint for each test (e.g., grade 3 reading, grade 5 mathematics, grade 8 science, Virginia and United States History).

The Grade 8 Mathematics blueprint contains information for two types of tests, the online computer adaptive test (CAT) and the traditional test. A CAT is an online assessment that is customized for every student based on how the student responds to the questions. This is in contrast to the traditional test in which all students who take a particular version (paper, large print, or braille) of the test respond to the same test questions. All online versions of the Grade 8 Mathematics Standards of Learning (SOL) test (including audio) are computer adaptive.

All students are required to take the online version of the SOL tests with the exception of students who meet the criteria for needing a paper test. All paper versions of the test (including large print and braille) will be administered using the traditional format. Beginning in spring 2019, there will no longer be a separate Plain English Mathematics assessment for English learners or students with disabilities who have documented significant language impairments. All test questions for Grade 8 Mathematics have been determined to meet the criteria for Universal Design. The Universal Design principles require that language that is not specific to the content area (e.g., mathematics) be simplified and test questions be written so they are accessible by all populations of students. The SOL test questions have been reviewed by Virginia teachers and have been determined to meet the criteria for Universal Design.

### **Reporting Categories**

Each test covers a number of Standards of Learning. In the test blueprint, the SOL are grouped into categories that address related content and skills. These categories are labeled as reporting categories. For example, a reporting category for the Grade 8 Mathematics Standards of Learning test is *Measurement and Geometry*. Each of the SOL in this reporting category requires the student to measure or solve a problem related to two- or three-dimensional figures. When the results of the SOL tests are reported, the scores will be presented for each reporting category and as a total test score.

### **Assignment of Standards of Learning to Reporting Category**

In the Grade 8 Mathematics SOL test, each SOL is assigned to only one reporting category. For example, SOL 8.1 is assigned to “Number, Number Sense, Computation and Estimation.”

### **Coverage of Standards of Learning**

Due to the large number of SOL in each grade level content area, every Standard of Learning will not be assessed on every SOL test. By necessity, to keep the length of a test reasonable, each test will sample from the SOL within a reporting category. All SOL are eligible for inclusion on the traditional forms as well as the CAT forms.

**Use of the Curriculum Framework**

The Grade 8 Mathematics Standards of Learning, amplified by the Curriculum Framework, define the essential understandings, knowledge, and skills that are measured by the Standards of Learning tests. The Curriculum Framework asks essential questions, identifies essential understandings, defines essential content knowledge, and describes essential skills students need to master.

**Grade 8 Mathematics  
Test Blueprint Summary Table**

<b>Reporting Category</b>	<b>Grade 8 SOL</b>	<b>Number of Items  Computer Adaptive (CAT) Format</b>	<b>Number of Items  Traditional Format</b>
<b>Number, Number Sense, Computation, and Estimation</b>	<b>8.1 8.2 8.3a-b 8.4</b>	<b>9</b>	<b>11</b>
<b>Measurement and Geometry</b>	<b>8.5 8.6a-b 8.7a-b 8.8 8.9a-b 8.10</b>	<b>11</b>	<b>13</b>
<b>Probability, Statistics, Patterns, Functions, and Algebra</b>	<b>8.11a-b 8.12a-c 8.13a-c 8.14a-b 8.15a-b 8.16a-e 8.17 8.18</b>	<b>22</b>	<b>26</b>
<b>Number of Operational Items</b>		<b>42</b>	<b>50</b>
<b>Number of Field-Test Items*</b>		<b>8</b>	<b>none</b>
<b>Total Number of Items on Test</b>		<b>50</b>	<b>50</b>

\*Field-test items are being tried out with students for potential use on subsequent tests and will not be used to compute students' scores on the test.

## **Grade 8 Mathematics Expanded Test Blueprint**

### **Reporting Category: Number, Number Sense, Computation, and Estimation**

**Number of Items: 9 (CAT) 11 (Traditional)**

#### **Standards of Learning:**

- 8.1 The student will compare and order real numbers.
- 8.2 The student will describe the relationships between the subsets of the real number system.
- 8.3 The student will
  - a) estimate and determine the two consecutive integers between which a square root lies; and
  - b) determine both the positive and negative square roots of a given perfect square.
- 8.4 The student will solve practical problems involving consumer applications.

### **Reporting Category: Measurement and Geometry**

**Number of Items: 11 (CAT) 13 (Traditional)**

#### **Standards of Learning:**

- 8.5 The student will use the relationships among pairs of angles that are vertical angles, adjacent angles, supplementary angles, and complementary angles to determine the measure of unknown angles.
- 8.6 The student will
  - a) solve problems, including practical problems, involving volume and surface area of cones and square-based pyramids; and
  - b) describe how changing one measured attribute of a rectangular prism affects the volume and surface area.
- 8.7 The student will
  - a) given a polygon, apply transformations, to include translations, reflections, and dilations, in the coordinate plane; and
  - b) identify practical applications of transformations.
- 8.8 The student will construct a three-dimensional model, given the top or bottom, side, and front views.
- 8.9 The student will
  - a) verify the Pythagorean Theorem; and
  - b) apply the Pythagorean Theorem.

- 8.10 The student will solve area and perimeter problems, including practical problems, involving composite plane figures.

**Reporting Category: Probability, Statistics, Patterns, Functions, and Algebra**

**Number of Items: 22 (CAT) 26 (Traditional)**

**Standards of Learning:**

- 8.11 The student will
- a) compare and contrast the probability of independent and dependent events; and
  - b) determine probabilities for independent and dependent events.
- 8.12 The student will
- a) represent numerical data in boxplots;
  - b) make observations and inferences about data represented in boxplots; and
  - c) compare and analyze two data sets using boxplots.
- 8.13 The student will
- a) represent data in scatterplots;
  - b) make observations about data represented in scatterplots; and
  - c) use a drawing to estimate the line of best fit for data represented in a scatterplot.
- 8.14 The student will
- a) evaluate an algebraic expression for given replacement values of the variables; and
  - b) simplify algebraic expressions in one variable.
- 8.15 The student will
- a) determine whether a given relation is a function; and
  - b) determine the domain and range of a function.
- 8.16 The student will
- a) recognize and describe the graph of a linear function with a slope that is positive, negative, or zero;
  - b) identify the slope and y-intercept of a linear function, given a table of values, a graph, or an equation in  $y = mx + b$  form;
  - c) determine the independent and dependent variable, given a practical situation modeled by a linear function;
  - d) graph a linear function given the equation in  $y = mx + b$  form; and
  - e) make connections between and among representations of a linear function using verbal descriptions, tables, equations, and graphs.
- 8.17 The student will solve multistep linear equations in one variable with the variable on one or both sides of the equation, including practical problems that require the solution of a multistep linear equation in one variable.



- 8.18 The student will solve multistep linear inequalities in one variable with the variable on one or both sides of the inequality symbol, including practical problems, and graph the solution on a number line.